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SEPTEMBER 1979

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THE HAZARD OF BEING OUTSTANDING

By General John D. Ryan

Thirteen years ago the following article appeared in Combat Crew. Ten years ago this month, copies were redistributed to 8AF wing and air division commanders at the direction of the 8AF commander. The philosophy is just as appropriate today if not more so than when originally published. Thank you, General John D. Ryan.

Col Richard A. Patrick
Director of Safety

One of the things you learn as an Air Force Inspector is the danger in being outstanding. This may seem to be a paradox, but it is not. Without special attention to the hazards of outstanding performance, an individual, crew or unit can fall into the fatal habits of complacency, carelessness and overconfidence.

Athletic coaches know the deep-seated weakness of a team that is convinced it is great. There are a thousand stories told of outstanding teams that were upset because of overconfidence. But aside from the cost of losing, athletes also know there is a great danger in self-admiration. As one coach put it "you only get hurt when you're loafing."

Loafing is sometimes easy to spot in outstanding units or crews. They do their jobs well, but with a certain casual ease that invites carelessness. While flying with such a crew, you hear a lot of loose chatter and joking on the intercom when there should be strict attention to business. Check lists are covered in a fast monotone, forms are filled out correctly but they are hard to read and sloppy.

This kind of crew seems to think it has the system made.

Nothing could be further from the truth. Such a crew is actually inviting disaster. When a tragedy finally occurs, investigators may be surprised to find that an error was made by a crew or individual which had always seemed perfect — had never made such a mistake before.

Once proficiency is achieved even greater effort and attention are needed to stay proficient without let-down over an extended period of time. And, such effort should be directed at doing more than physical repetition or simple practice. The greatest effort should be directed toward stimulating minds and building positive attitudes that will not permit complacency. In short, emphasis should be placed on Air Discipline.

Over-training an individual to perform a task automatically is relatively easy. Through repetition almost any job, even the most complex, can be reduced to unconscious, mechanical actions. Nothing could be more dangerous or more destructive to Air Discipline.

More than mechanical ease in procedures or total recall of tech data, Air Discipline demands alertness. It demands that each action and procedure be approached with total attention and seriousness. Mechanical response without attention is one of the most dangerous faults in flying.

Most lucky pilots have a secret memory of a time when they looked at a switch or instrument without seeing it, or have heard a check list item being read and responded automatically without thinking. Many have survived the experience of deviating from a flight plan or a restriction or a standing procedure. If they are professionals they realize that

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luck had been on their side — not skill or intelligence.

While one of the important objectives of any emergency procedures training program is to overtrain to the point that response to an emergency is immediate, such training is not intended to eliminate thought and judgment. It is, in fact, designed to give the crewman more time and opportunity for thought and judgment by making physical response almost automatic. Response totally without thought invites an accident.

Even though the need for an attitude of alertness and attention in aircrew discipline is particularly acute, there is a similar need for this attitude among missile combat crews, maintenance specialists and supervisors at all levels. SAC combat operations are at the peak of a pyramid of actions and decisions made by thousands of people who may have no apparent relationship to their unit's war orders. The truth is that all SAC actions support combat capability. Over-confidence or complacency at any place in the command can have fatal consequences.

The Strategic Air Command has just completed a record year of flying safety and this command should take pride in its accomplishment. But pride is a dangerous emotion. It can generate a casual attitude.

Pride in accomplishment can be an incentive to further outstanding performance. Pride can stimulate greater attention to detail in carrying out orders, following procedures and observing tech data. Pride can result in even better records of accident-free flying.

This is the way professionals respond to success.

Combat Crew

Magazine of the Strategic Air Command - 30th Year of Publication

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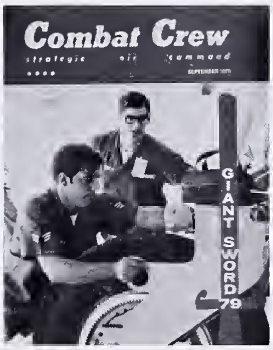

ON OUR COVER

SAC loading crews and security police will be performing during Giant Sword '79 this month. For more see page 4.

SACRP 127-1 **VOL. XXIX NO. 9** **SEPTEMBER 1979**

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Subscriptions are available from: The Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Price: $14.00 per year domestic; $17.50 if mailed to a foreign country; or $1.20 single copy. Authority to publish this periodical automatically expires on 26 January 1980, unless its continuance is authorized by the approving authority prior to that date. Contributions are encouraged as well as comments and criticisms. Direct correspondence with the Editor is authorized. Address correspondence to Editor, COMBAT CREW, Hq SAC IGFC, Offutt AFB, Ne. 68113.

Giant Sword

Maj Stephen J. Miller
Editor

The 43d Strategic Wing will have its work cut out for it in trying to be the repeat winner of the coveted Barrentine Memorial Munitions Loading trophy. This year's Giant Sword competition will again take place at Ellsworth AFB as it has for the past four years.

Joining the 20 munition teams will be security police teams and aircraft crew chiefs. Last year's security police team from Ellsworth AFB took the marksmanship honors and performed the best practical exercise on their way to winning the best security police unit honors. The best crew chief was SSgt Donald Billings, Jr., from the 416th BMW, Griffiss AFB.

The Giant Sword competition brings together SAC's finest munitions people, security police and

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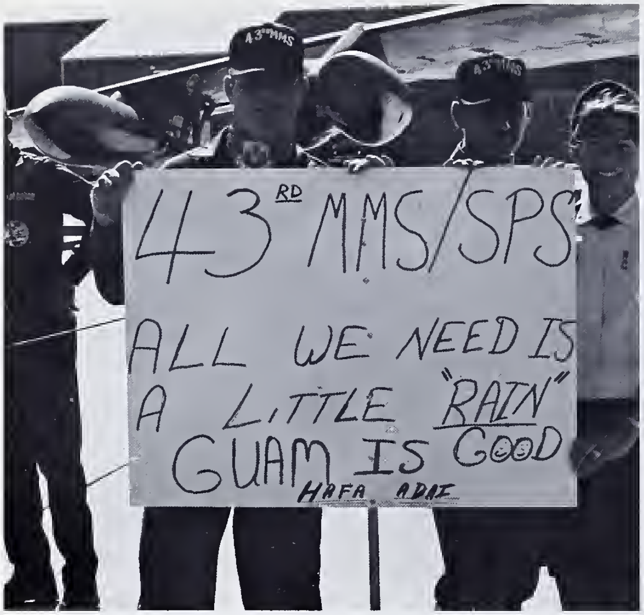
43RD MMS
43RD MMS
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ALL WE NEED IS
A LITTLE "RAIN"
GUAM IS GOOD
HAFA ADAI

GROUND USE ONLY
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CAUTION

crew chiefs for a grueling week's competition. This year September 10-19 has been selected for the competition dates.

No actual weapons will be loaded during the competition. Using training devices each munitions team will upload two different classes of weapons. The teams will be loading only on their respective type of aircraft. There will be four different SAC aircraft represented in the competition. These are: B-52D, G, and H, and the FB-111.

The security police teams will be required to handle realistic security situations involving the protection of weapons loaded aircraft. The ability to handle these situations coupled with marksmanship scores and a written test will make up the 1500 point test.

Giant Sword Munitions Loading Competition is under the overall direction of Brig Gen James E. Light, Jr., SAC DCS Logistics. For the competition the Director of Munitions is Col Richard G. Grammer and the Chief of Security Police is Col Donald F. Gaylor. Also, the Deputy Competition Commander for Munitions Affairs is Lt Col Patrick A. Palmier. The Deputy Competition Commander for Security Police Affairs is Lt Col Lars Vedvick.

This year the Barrentine Trophy chase should be a good one. Combat Crew wishes each participant the best of luck.

BARRENTINE BEST IN SAC

1978	43SW	Andersen
1977	93 BMW	Castle
1976	7 BMW	Carswell
1975	93 BMW	Castle
1974	93 BMW	Castle
1960	384 BMW	Little Rock
1959		
1958		
1958	29 Aviation Depot Sq.	Homestead

BEST SECURITY POLICE UNIT

1978	44 SPS	Ellsworth
1977	379 SPS	Wurtsmith
1976	97 SPS	Blytheville
1975	42 SPS	Loring

BEST AIRCRAFT CREW CHIEF

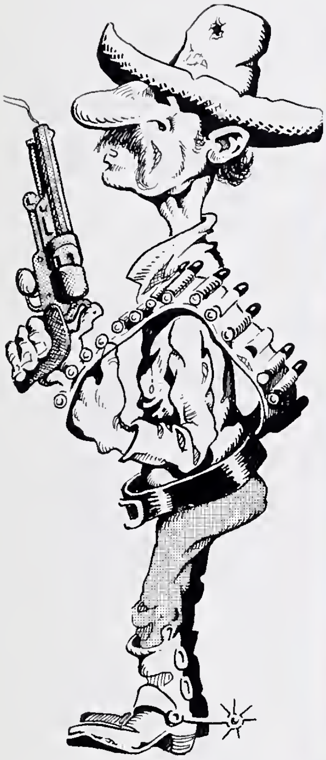
1978	416 OMS, SSgt Donald R. Billings, Jr.,	Griffiss
1977	5 OMS, SrA Keith D. Rappleyea ,	Minot
1976	379 OMS, SSgt Ted Scoggins	Wurtsmith
1975	28 OMS, Sgt Jeff Redder	Ellsworth

BULLET BLITZ 6

Capt Bill Craig
528 Bomb Squadron
Plattsburgh AFB NY

"Missile away!" The call crackled out over UHF from the FB-111 to Mission Control at the Tonopah Test Range, Nevada. After a flight of six hours and 3,000 miles, Plattsburgh AFB Crew E-23 successfully released their Short Range Attack Missile (SRAM) within nine seconds of the control time and within 90 feet of centerline. Col Donald L. Ashley, 380th Bombardment Wing Deputy Commander for Operations, described the March 30 mission as "the best launch of a SRAM yet at Plattsburgh."

The tenth in a series of BULLET BLITZ VI launches, the mission objective is to evaluate all areas of SRAM performance in an operational environment. The accuracy and reliability of the missile itself is tested, as well as the performance of the carrier aircraft and aircrew. The aircraft and the missile to be launched are selected at random by SAC Headquarters. Each crew is chosen by the



Captains Richard Barringer (left) and Thomas Larkin, FB-111 Crew E-23, 528th Bombardment Squadron, before takeoff.

wing based on criteria established in the operations order. By using a wide cross-section of crew experience levels, the effectiveness of the combat crew training programs can be evaluated. By taking off using a modified alert scramble procedure and flying a simulated Emergency War Order (EWO) profile, current employment tactics and flight manual procedures can be verified.

Captains Thomas M. Larkin, pilot, and Richard J. Barringer, navigator, 528th Bombardment Squadron, began mission planning four weeks before the launch. After the charts and flight plans were completed, specialized training emphasized route study, pacing, and integrating the test range procedures with their normal checklists. Both the pilot and navigator became thoroughly familiar with Tonopah Test Range safety requirements and countdown sequence described in the operations order. Capt Larkin explained, "Communications with Mission Control were critical for a successful launch. Any number of malfunctions, most of which would not affect us on an EWO mission, could have forced us to abort the release for safety of flight. The site had to be tracking us on radar and receiving clear signals from the missile telemetry package. The weather at the launch point had to be clear, and both the SRAM and the carrier aircraft systems had to be working perfectly."

Working under Capt Paul H. Winkler, wing SRAM project officer, Capt Barringer drew his own radar predictions for dozens of fixpoints. Unlike a bomb drop, where cross-hair placement on the release offset can compensate for errors in the avionics system, the circular error (CE) for a SRAM is dependent on an exact present position in the aircraft navigation computers. In a digital/inertial system like the Mark IIB, a highly refined navigation

Continued on Page 20

OPS—UP-DATE

HQ SAC DCS/OPS

MAJOR GENERAL JACK L. WATKINS

Having just completed my assignment as the HQ SAC DCS, Operations, I wanted to take this final opportunity in OPS UP DATE to express my appreciation for the outstanding support I received from throughout the command. I leave you with this thought — the good life is where the action is! The action is in operations! Operations is the good life! — Jack Watkins

DIRECTORATE OF COMMAND CONTROL, SPACE AND SURVEILLANCE — COLONEL CLARENCE R. AUTERY

HEADQUARTERS EMERGENCY RELOCATION TEAM (HERT) — The purpose of the HERT is to ensure a cadre of pre-selected Headquarters SAC personnel survive an attack, reassemble, and perform command functions in a post attack environment. Working with elements of the Post Attack Command Control System (PACCS), they will reconstitute the Headquarters and manage and redirect surviving SAC forces. The HERT is commanded by the SAC Chief of Staff and is composed of: A key Staff; an Essential Element; and a Support Element. The Key Staff consists of selected general/senior officers who provide continuity and direction during reconstitution. The Essential Element includes knowledgeable personnel from critically important Headquarters agencies. The Support Element is composed of personnel and equipment resources required to provide services to the HERT. In addition to the Headquarters SAC HERT, the Numbered Air Forces have been tasked to develop HERTs. Aircrews can and should anticipate contact with HERT, in addition to the PACCS, in a post attack situation. (Maj James E. Nowak, DOCAB)

OPERATIONS SECURITY — OPSEC has been with us since 1966. Its goal is to prevent disclosure of classified and **unclassified** information containing intelligence indicators that can be used to degrade operational effectiveness. A dynamic unit OPSEC program should accomplish this goal by creating an awareness of operational security requirements. How is this awareness developed? It begins when all members of a unit understand that they are the key players in the entire OPSEC program. Any unguarded discussion or unclassified bulletin, schedule, or report may be extremely valuable to hostile elements trying to piece together data on an upcoming mission or exercise. While the piece of information (intelligence indicator) may appear insignificant, your comment or written material may be the needed key to the entire mission. So, the next time you are preparing written material or engaging in a discussion with your friends ask yourself, "Am I releasing information that may jeopardize the safety of fellow crewmembers or the success of the mission?" If so, if there is any doubt, or better yet, unless there is a legitimate need to reveal it — **DON'T!** (Maj Van Chappel, DOCSP)

DIRECTORATE OF TRAINING — COLONEL JOHN J. DORAN, JR.

FY 79 FLYING HOUR PROGRAM — The Chief of Staff Air Force, General Lew Allen and CINCSAC, General Ellis have been strong advocates of increased flying programs. Our commanders have emphasized the urgency of demonstrating a credible need for increased funding by making full and productive use of the resources appropriated to support flying programs. General Allen urged all MAJCOMs to get ahead on their flying in order to insure full use of this year's program and to be in an optimum position to apply any additional resources that might become available to remaining readiness requirements. SAC responded to this goal by flying 102% of its cumulative program as of 30 June 1979. This outstanding effort by the operations and support members of the SAC "First Team" enabled the Air Force to report the best winter quarter flyout since the end of the SEA era. Each of you can justly share in General Allen's words of commendation "for the record established so far" as you continue to meet his FY 79 objectives by flying productive sorties which contribute directly to combat readiness and training. (Lt Col Douglas Jamieson, DOTFF)

KC-10A TRAINING — On 29 June 1979 Air Training Command released a Request For Proposal (RFP) to prospective contractors that will lead to an aircrew contract training program for the KC-10. SAC "trainers" will provide technical expertise to ATC during a proposal evaluation phase of the procurement process. Contract award is expected in February 1980, with training starting in January 1981.A total of 27 active crews and 27 reserve crews will initially be trained to fly the 20 KC-10s to be purchased by 1983. (Capt Johnny Griffin, DOTP)

-135 PERFORMANCE DATA. Are you working more performance problems but enjoying it less? Change 37 was recently distributed to all (non-fan) -135 users throughout the AF. This change has created several problems due to chart complexity, poor printing quality, etc. In addition, increases in takeoff speed have significantly impacted maximum gross weight takeoff capabilities. To resolve this situation, OC-ALC and Boeing Company have been tasked to conduct an in-depth analysis of the entire -135 performance planning process, with two primary objectives in mind — increasing performance of the J57 powered aircraft to its maximum potential, and simplifying the computation process as much as possible. The SAC goal is **maximum tabulation** of performance data and simplification of all data which cannot be tabulated. Look for significant improvements in -135 performance data in the near future. (Lt Col Dick Runkle, DOTT)

DIRECTORATE OF MISSILE OPERATIONS — COLONEL JOE L. CHURCH

TRAINING/STANDARDIZATION CONFERENCE — The annual SAC Missile Training/Standardization Conference is planned for the period 15-19 October 1979 at Vandenberg AFB, CA. The conference will be hosted by the 3901 SMES and will include attendees from several HQ SAC agencies, the Numbered Air Forces, air divisions, and each missile wing. The purpose of the conference is to review current and proposed missile crew training and evaluation concepts, review program actions/changes required for future weapon system modifications, and conduct instructor and evaluator workshops. We're looking forward to another fruitful conference of great benefit to all. (Maj Ken Roberts, DOMM)

FIELD TEST OF ILC/ERCS AT WHITEMAN AFB, MO. — During the period of 26 July 1979 through February 1980, Whiteman AFB personnel will be conducting a field test of the newly modified Improved Launch Control System/Emergency Rocket Communication System (ILCS/ERCS) equipment. The purpose of this test is to demonstrate the operability of the ILCS software as it interfaces with ERCS. The Unit Test Manager, Major Alex Abela and the test team, composed of unit maintenance and operations personnel, will conduct the test in coordination with HQ SAC, Vandenberg AFB, Ogden ALC, and ALCS aircraft. Test objectives will be met through an operational test launch (GIANT MOON 9), Simulated Electronic Launch-MINUTEMAN (SELM) and special tests conducted at Whiteman. Detailed test sequence documents are being developed by Major Abela and his test team to insure all facets of the modified equipment perform as expected in the operational environment. (Major Forrest A. Burkard, DOMV)

DIRECTORATE OF TANKER OPERATIONS — COLONEL JOE H. SNOW

TANKER TOPIC — KC-135 crews are again proving they play a critical role in the worldwide planning of Lateral Commands. 20% of all tanker crews are participating in the deployment or redeployment of TAC aircraft to/from overseas locations during the 39 day period commencing 28 Aug 1979. Between 25 Sep and 5 Oct tankers will be involved in the movement of a TAC squadron across the Atlantic every 2 days. Participating crew members will become familiar with the terms Crested Cap, Coronet Shetland, Coronet Rider and Coronet Pony. These missions will put into practice the procedures and techniques for which SAC crews continuously train. The plans are made, the dates established; now it's in your hands. You the crew members have to make it work. Good luck. (Maj Herb Lubin, DOK)

DIRECTORATE OF BOMBER OPERATIONS — COLONEL EDWARD F. GEHRKE

FOCUS LENS 79 — Korea — In August a SAC Advanced Echelon (ADVON) deployed to Korea to control simulated SAC conventional forces there. This annual exercise is another example of our worldwide involvement in contingency and collateral missions. Exercise simulation affords excellent in-theatre opportunities to test planning factors, concepts and procedures which integrate SAC assets in the theatre air battle. (Maj Robert L. Kimball, DOOC)

AUTUMN FORGE 79 — Europe — This large scale series of exercises is played throughout Europe in the fall. Again, the SAC ADVON will be deployed to control the flying portions of these Field Training Exercises. All aspects of the conventional/collateral roles will be exercised from a forward operating location. Invaluable training for ADVON, staff, aircrew and support personnel will be gained from operating in this realistic environment. (Maj Robert L. Kimball, DOOC)

BUSY LUGGAGE — The 320 BMW, Mather AFB, CA, will conduct a BUSY LUGGAGE flight test mission on 12 September 1979. During the mission, the last of six missions planned for the CY-79 program, two inert test weapons will be released from low altitude on the Tonopah Test Range, Nevada. BUSY LUGGAGE, the exercise term for SAC participation in the Air Force/Department of Energy (DOE) Joint Flight Test Program, is conducted on an annual basis. The program is designed to verify the capability of SAC's weapon systems to function in a variety of stockpile-to-target environments. Tests also verify the continuing compatibility between DOE and DOD subsystems. (Maj George Whipple, DOOV)

OPS UP DATE

DIRECTORATE OF WEATHER — COLONEL ALFRED C. MOLLA JR.

EDITOR'S NOTE: Another period of maximum solar activity is here. Most military operators, especially communicators, are aware of the disturbing effects increased solar activity has on radio communications. Radio communications are not the only area affected. There are many ways in which high levels of solar activity temporarily interfere with our activities — navigation systems, space travel and satellites, electric power distribution, telephone long-line equipment, computers, radars, petroleum exploration, and weather can be affected as well. Some of these occurrences are nuisances; others present real hazards to life and limb. The following article contains highlights of a scientific paper by H. H. Sargent III, the chief solar forecaster at the Space Environmental Services Center, Boulder, Colorado, for the National Oceanic and Atmospheric Administration. It is informative and can acquaint you with the far-reaching aspects of increased solar activity.

Some Effects of Increased SOLAR ACTIVITY

Scientists have been aware of sunspot cycles for centuries; records go back as far as 1700 (Fig 1). The sunspot cycle is defined as the running average sunspot number, which is the weighted sum of the number of sunspots and sunspot groups. The average period of the solar cycle is approximately 11 years; however, variations of 4 to 5 years (more or less) from the 11-year cycle have occurred. The most recent solar minimum occurred in early 1976 and the previous maximum took place in late 1968. We are approaching another maximum which is theorized by some to be one of the most active periods in the past century and expected to occur in late 1979.

A typical solar disturbance begins with a major flare on the visible surface on the sun. Solar flares usually erupt suddenly and have lifetimes from a few minutes to hours; the average lifetime being ½ hour. During these disturbances, varying intensities of high energy electro-magnetic radiation and sub-atomic particles are emitted into space and portions can intercept the earth's atmosphere (Fig 2). The X-ray and ultraviolet radiation given off during the flare reach the earth within minutes, and cause an abrupt increase in the ionization of the lower levels of the sunlit ionosphere mainly at low latitudes.

Next, fast moving, very high energy protons, also produced in the flare process, arrive at the earth within 15 minutes to 1 hour, and the effects of their deep penetration can be measured at the earth's surface. These events occur infrequently; only 23 such events have been observed from 1942 through 1974. More common, lower energy particles arriving later (20 minutes to 20 hours) stream in at the earth's polar latitudes and produce Polar Cap Absorption (PCA) — tremendous ionization increases in the lower portions of the polar region ionosphere. These disturbed conditions may persist for several days and can result in a total radio blackout lasting for hours.

Finally, low-to-medium energy protons and electrons, arrive 20 to 72 hours later, disturb the earth's magnetic field and produce a major geomagnetic storm. These storms are accompanied by intense ionospheric disturbances and visual auroral displays.

Air Weather Service provides notification of solar-geophysical activity to all DOD systems operating in the near-earth environment from 50KM (lower edge of the ionosphere) outwards into space. HF communications, radars, and satellites are among the DOD systems supported.

Immediate X-ray alerts are provided to communications' customers to warn of imminent HF short-wave fade outs. Since forecasting solar events and their associated effects on the earth's atmosphere is extremely difficult, the emphasis is placed on immediate notification.

AWS has a world-wide network of six solar observing (optical and radio telescope) sites. These sites are supplemented by other stations which detect variations in the earth's magnetic field, variations in the signal strength of cosmic radio noise, and variations in the total electron count of the ionosphere. All of this information is integrated and continually analyzed to detect and predict disturbances in the solar-geophysical environment.

The majority of the radio frequency spectrum is subject to temporary disruptions caused by solar flares. Most aircraft rely on radio communications for safe operation. Temporary outages of air traffic control systems are a serious matter with

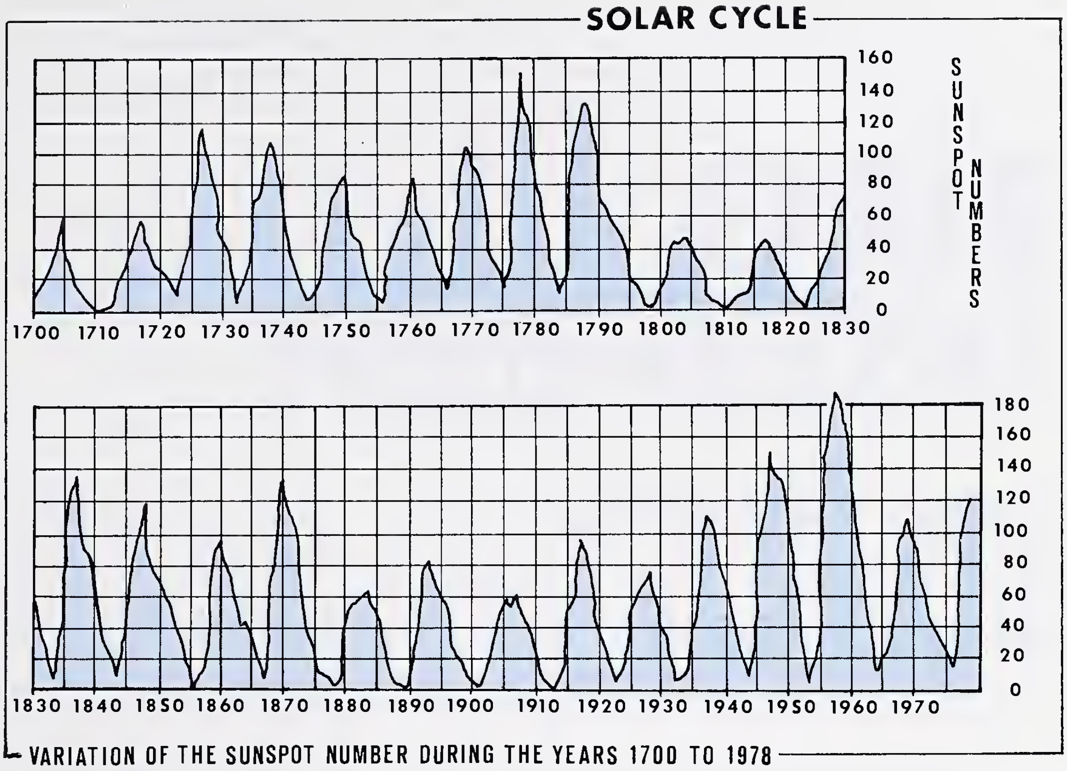


Figure 1 VARIATION OF THE SUNSPOT NUMBER DURING THE YEARS 1700 TO 1978

thousands of aircraft in the air each day around the world.

Commercial aircraft that approach US shores communicate with the nation's gateway airports by high frequency radio links. These channels typically experience brief fading or blackout conditions almost immediately after a large solar flare. These effects may last as long as 2-3 hours. Since most protons usually take some hours to reach the earth after a major flare, PCA events do not usually begin immediately. But once they begin they may last for hours, making it difficult to communicate with aircraft in the polar regions.

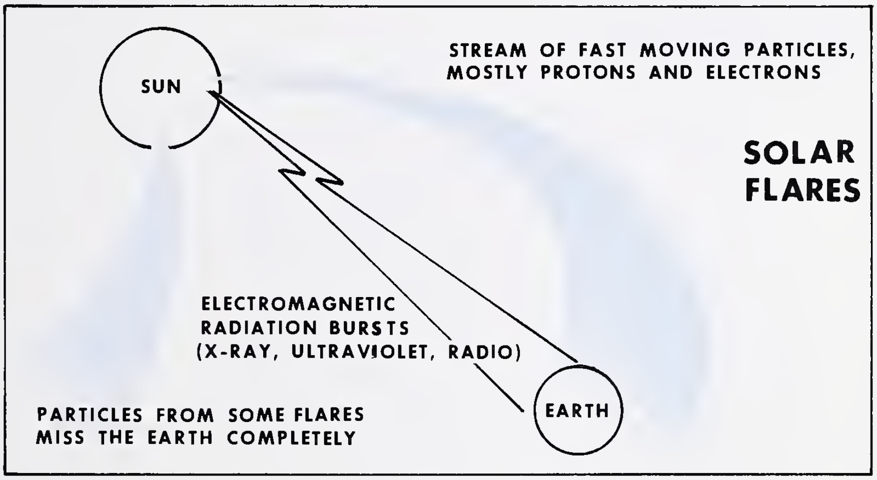

SUN
STREAM OF FAST MOVING PARTICLES, MOSTLY PROTONS AND ELECTRONS
SOLAR FLARES
ELECTROMAGNETIC RADIATION BURSTS (X-RAY, ULTRAVIOLET, RADIO)
EARTH
PARTICLES FROM SOME FLARES MISS THE EARTH COMPLETELY

Figure 2

The ionospheric storm that often accompanies a magnetic storm may not begin for a day or two after the solar flare. Once it does begin, it may last for 5 days or more. The general effect of an ionospheric storm is to decrease the maximum usable frequencies and increase the lowest usable frequencies. Electron density irregularities in the ionosphere may cause persistent fading problems which last for days.

Solar radio noise accompanies many large solar flares. High levels of solar radio noise can interrupt communications on VHF channels commonly used by most aircraft flying over populated areas of the world. These interfering solar radio signals can drastically curtail range and effectiveness of VHF communications, and potentially reduce margins of flight safety.

Citizens' Band (CB) radio performance can also be degraded. Although CB radios are often used for "social conversation," their emergency message capability has added a new dimension to highway safety. CB communication could be temporarily disrupted or could be "bounced" for several hundred miles causing confusion in local areas.

Solar radio noise can produce Radio Frequency Interference (RFI), also known as Electromagnetic Interference (EMI), on UHF radar systems such as BMEWS, COBRA, DANE, SLBM, etc. Moreover, auroral activity associated with major geomagnetic storms can produce "clutter" on high latitude radar systems operating at frequencies below 1000MHz.

Continued on Page 26

BIG INSTRUMENT

FLYING PROCEDURES IN THE UNITED KINGDOM

Captain James M. Sullivan
Captain Larry W. Tieman
1st CEVG Instrument Division
Barksdale AFB, Louisiana

SAC aircrews have had limited opportunities for flying in Europe in years past. Those opportunities are increasing because of the renewed emphasis on NATO support. Recently, three bomber crews participated in the RAF Strike Command's bombing and navigation competition. Tanker crews will soon be refueling USAFE and NATO fighters from RAF Fairford, as well as RAF Mildenhall. While flying in the U.K. is enjoyable, the British do some things a bit differently. Here is a look at some of the differences in the way airspace is divided, altimeter changeover procedures, and communication requirements.

AIRSPACE DIVISION

Airspace in the United Kingdom is divided into two categories: General Air Traffic (GAT) and Operational Air Traffic (OAT). GAT airspace is civilian controlled and civilian oriented. OAT airspace is controlled by RAF military controllers. The dividing lines are unlike those in the United States.

The GAT system is composed of low altitude airways and upper air routes. The airways/routes were developed to handle a high volume of traffic and operate much like the U.S. jet route system. An airway joining clearance is required prior to entering the GAT structure. VHF radio capability is normally required to fly in the GAT system. While it's possible for USAF aircraft to fly on a GAT route, almost all military flying is done in the OAT airspace structure.

All of the airspace not used by the GAT airway structure belongs to the OAT system and is controlled by the RAF. The OAT system comprises the majority of U.K. airspace and is normally used by military aircraft. It was designed to handle the unusual requests associated with the typical military flight profile: enroute delays, block altitudes, and air combat maneuvers. OAT airspace is vertically divided into three sections.

The Upper Airspace region is defined as FL245 to Unlimited. An area of mandatory radar service exists from FL245 to FL660. All military aircraft *must* be in contact with the appropriate military radar unit and fly under its radar control instructions. No heading or altitude changes can be made without the prior approval of the controlling military radar. Separation is provided from permanent radar echoes, areas of intense weather, and any *known* traffic. Military aircraft are encouraged to use OAT routes (TACAN routes), but point to point navigation can also be used if mission requirements dictate.

Middle Airspace extends from FL080 to FL245. Military radar will provide advisory service in Middle Airspace within radar coverage limits. The area of radar cover is calculated as 1,000 feet of height per 10 NM from the radar out to 60 NM, and 1,500 feet per 10 NM, thereafter. For example, an aircraft 40 NM from the radar site would have to be at or above FL040 to receive radar advisory service.

Lower Airspace extends from 3,000 feet up to FL080. The available radar service is very limited. Radar service in this area may be provided by RAF aerodrome facilities depicted in the FLIP IFR Supplement for Europe/North Africa/Middle East.

In Middle and Lower Airspace, pilots must notify military controllers of any change in flight conditions (IMC or VMC). Radar advisories are relayed based upon those flight conditions. In VMC, the pilot will be given the details of conflicting traffic

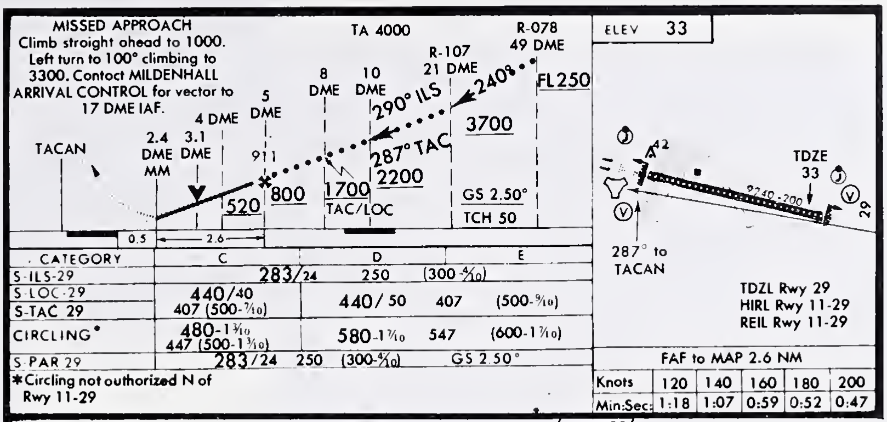


Figure 1 HI-TACAN OR ILS/DME RWY 29 52°22'N-00°29'E MILDENHALL ENGLAND MILDENHALL (EGUN)

followed by advisory instructions to maintain separation. In IMC, the advisory instructions are given first, followed by the details of the conflicting traffic.

There are no requirements for pilots (other than USAF pilots) flying VMC or IMC to file a flight plan or notify ATC of their presence in Lower or Middle Airspace. As might be expected, 80% of the near collisions in the U.K. occur below FL080. Heads up — this is Indian country.

This system of airspace division is not unique to the United Kingdom. It also exists in other areas of Europe and Africa. The rules change between countries. Always check FLIP Area Planning, Volume 2, to be sure of the house rules before you get into the game.

ALTIMETER PROCEDURES

The term "FL080" may have sounded strange when you read it earlier. U.K. procedures establish a transition altitude that's published on instrument approach and departure charts. In Figure 1, the transition altitude at RAF Mildenhall is 4,000 feet. Outside controlled airspace, the transition altitude is normally 3,000 feet MSL, based on the regional QNH (altitude above Mean Sea Level). This may vary, depending on the height of the local terminal control area or military aerodrome traffic zone. When climbing through the transition altitude, crews will set 29.92 in the altimeter window. All altitudes above the transition altitude are referred to as flight levels.

RAF controlled aerodromes issue QFE altimeter settings to arriving and departing aircraft. Remember that QFE altimeter will indicate zero at touchdown, rather than field elevation.

COMMUNICATIONS

All USAF airfields in the U.K. are located in uncontrolled airspace. The only ATC clearance issued is for a departure out of the associated military aerodrome traffic zone. You would not be "cleared to *(destination)*", but "cleared to depart the Honington control zone", for example. Once airborne, you would be expected to follow the flight plan you filed. On an OAT flight above FL245, aircraft are treated as though the aircraft is operating in controlled airspace, even though the military radar unit has no procedures to issue an ATC clearance. In fact, the military radar controllers do not utilize the flight plan you filed. Don't be surprised when the controller asks your intentions. He/she is not accusing, only curious!

When filing into the GAT system, an inflight clearance *must* be obtained from the appropriate civil ATC agency 10 minutes before joining the airway structure. When flying in the OAT system, you still are responsible for coordinating with the military controller to be cleared to cross a GAT airway. Request crossing clearance at least five minutes prior to crossing the airway to allow the military controller time to coordinate with the civil unit controlling the airway traffic.

A final note on emergency communications. If you experience an emergency, use the terms "PAN" or "MAYDAY" to alert the controller. The British do not recognize such expressions as "declaring an emergency", "I have a problem", or "minimum fuel". The controller will most probably direct you to switch to 243.0 MHZ, which places you in direct contact with the central RAF emergency organization for priority handling. Once the entire emergency network has been alerted, you can expect to return to a discrete frequency for mission termination.

When first experiencing U.K. flight procedures, they may seem very "free-wheeling" to you compared to the positive control system in the U.S. On balance, the British system works very well and provides you with every capability to accomplish your mission. At the same time, the aircrew is more directly responsible for anticipating heading changes, airway crossings, etc. Although you may feel uncomfortable initially in the new environment, you will probably learn to like it. Besides, there is undeniable wisdom in the old adage, "When in Rome . . ."

"Congratulations to the men and women of your command on the superb results of recently completed exercise GLOBAL SHIELD.

"The teamwork demonstrated during all phases was outstanding. Particularly noteworthy were the generation, flying and support team deployments.

"Exercise GLOBAL SHIELD was a complete success and demonstration of the readiness of a major portion of our strategic forces."

Gen. David C. Jones
Chairman, Joint Chiefs of Staff

GLOBAL SHIELD

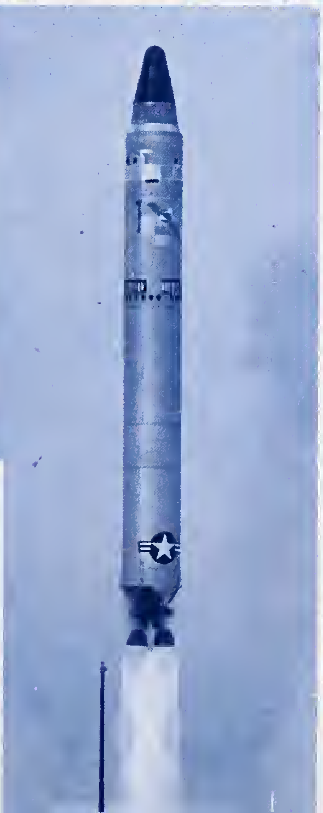
We have just completed GLOBAL SHIELD 79, our largest and most comprehensive exercise in over 20 years. It was a tough, demanding exercise, testing every segment of SAC's operational capability — the bombers, tankers, missile and reconnaissance forces, associated Air Reserve Force units and command control and communication elements.

Initial evaluation of the exercise indicates that all of our objectives were achieved. Everyone had an opportunity to gain valuable training in the performance of our EWO mission and, at the same time, to help identify ways to improve our plans and procedures. There were a few problems — that was to be expected — but overall, the exercise was highly successful.

I am proud and commend each member of this command for the professional manner in which you carried out your critical duties throughout this exercise. Through your dedication and hard work, we were able to once again show the American people, as well as any potential adversary, the true readiness and effectiveness of the nuclear deterrent forces of the Strategic Air Command. Well done.

R. H. ELLIS
General, USAF
Commander in Chief

USAF



80129
U.S. AIR FORCE

CFIC Corner

One Down — Three to Go

Captain Norm Hythecker
Central Flight Instructor Course
Carswell AFB, TX 76126

One Down Three to Go — to most KC-135 pilots this phrase has little meaning, but if you've ever been one of the few pilots unlucky enough to lose an engine on initial takeoff or during a touch and go you might feel this phrase has more significance.

If you've ever lost an engine during the takeoff phase, obviously you did the right thing and continued to fly the airplane. If this is so — you probably don't need to read on, but if you haven't experienced an engine failure and want to stack "luck" in your favor you might want to read and consider the factors of performance and control that affect our aircraft in an asymmetric condition.

Most 135 pilots can quote the tech order procedures for "Engine Failure Takeoff Continued", chapter and verse. They have practiced these procedures over and over in the CPT and in flight from 200′ above the field elevation. Some have even been able to practice engine failures (simulated) on the runway in CCTS training or in CFIC, but these were all controlled situations. What happens when we lose an engine for the first time unexpectedly? Will you be ready? Are the conditions the same? Will knowledge of procedures alone be enough?

As the latest SAC Hangar Flying videotape says, "Procedural knowledge is not enough. You need to mentally and physically prepare to lose an engine **Every Time You Take Off** in the KC-135".

Being aware of our performance factors, airfield and terrain considerations, tech order procedures, air traffic control limitations and the overall flying environment can help, but there is more we can do to be ready for unexpected engine loss.

Try to analyze the entire situation. Where will the engine failure occur? On the runway just after S-1? Just after rotation? In the climbout? Just after power is set on the Touch and Go? What could distract or confuse me? An explosion? Visible Fire? Cockpit indications? Radio or interphone calls? How will I react? What are my visual cues to fly the airplane? If you mentally prepare by answering these and other similar questions, the odds to successfully survive are in your favor.

The tech order talks about physical preparation — seatbacks vertical, pedals adjusted, etc. Don't consider these aspects too lightly. It can be awfully frustrating and down right dangerous to find yourself out of position or locked into a bad position if you need to make controls inputs in an unusual situation.

Performance Vs Control

Keeping in mind what we said about mental and physical preparation, let's look at performance and control factors that affect us on takeoff.

Most tanker pilots hate to see those heavy weight takeoffs on the 60-9 weekly flying schedule. Invariably they ask themselves what the scheduler has against them and continue with — "Don't they know what'll happen if I lose an engine in that beast?" Few pilots take solace in the fact that in peacetime all our takeoffs are planned with adequate three engine performance in mind. You could argue that a three engine 500 ft/min rate of climb isn't much, but it is sufficient, and your ground run on three engines is always less than runway available, even with partial throttle. Traffic pattern operations also require a 500 ft/min climb rate, so that provides us with that adequate margin. If we have satisfactory performance planned into every takeoff, then what is the problem? The problem is control.

Take a look at the KC-135 procedure for Engine Failure Takeoff Continued. Notice the first step, the big, bold print letters that say, "MAINTAIN FLIGHT". While this statement may seem basic or elementary to most pilots, it needs to be reemphasized, because in the history of the tanker there has never been an aircraft crash solely as a result of an engine failure and its associated lack of performance. Lack of control however, is a totally different matter.

On any KC-135 takeoff, control always needs to be considered. An engine failure will always affect aircraft control to some degree. On a heavy weight, wet takeoff you need to accelerate a large mass to flying speed. To cause this large moving mass to deviate you need a large counteracting force. (An engine loss might provide you with this force.) Once the engine loss occurs and the force is provided, the aircraft flight path or ground track will begin to change. The rate of change will be a factor of the force exerted and the mass moving or more simply stated: The heavier the aircraft, the longer it will take it to deviate. If you allow the deviation to develop however, or increase the force (thrust), it will be that much more difficult to stop the yaw. Again the heavier the moving mass is, the more force required to stop the movement.

A light weight aircraft, on the other hand, presents a bit different problem. The mass is lighter and therefore reacts much more quickly to an engine failure (that opposing force). By the same token, because you have less moving mass to control you can easily recover — if your rudder inputs are timely and correct, and you don't aggravate the condition by prematurely adding additional thrust.

Recovery from an Engine Loss on the Runway

Your primary flight control to correct the yaw caused by a failed engine is always the same — rudder. But how you apply it and which rudder you use obviously depends on a number of situations. Let's first look at the engine failure on the runway, after S_1, but before rotation.

If you have to lose an engine on takeoff, I suppose the best place to lose it is while you are still rolling in the 3 point attitude. When the aircraft is on the ground and an engine is lost, the main response you need to counter is yaw. The aircraft usually doesn't roll, and pitch is obviously not a factor. If yaw then is what we really need to combat, how do we do it? What control do we use and how much do we need to apply?

Simply stated, all you have to do is look out the pilots' windows at the runway and use the appropriate rudder to smoothly steer the aircraft back toward the centerline. If you make it a habit on every takeoff to continually correct to, or stay on the centerline, you may already be putting in the correct rudder at the instant the engine failure occurs and never deviate by more than a few feet. Rudder application should be immediate but controlled. Immediate reaction will be more effective than arbitrarily applying full rudder. Do not attempt to correct back immediately to the centerline unless the aircraft is departing the runway. As the groundspeed increases, the rudder becomes much more effective and once the yaw is stopped the aircraft will correct toward the centerline with no further increase in rudder. Make darned sure the yaw is completely stopped before you rotate, if you possibly can. A dynamic yawing condition as the aircraft is rotated for takeoff will greatly increase your chances of striking the ground with a wing tip or engine pod as a yawing aircraft will invariably cause roll.

Finally, remember that if obstacles pose no problem to your takeoff, you should always consider keeping the aircraft on the runway as long as you

Continued on Page 27

BULLET BLITZ

Continued from Page 9

Crew Chief A1C Steven P. Male, 380th Organizational Maintenance Squadron, stands by with Crew E-23.

model must be built up and maintained over a period of time. Precise radar update points are the key to that accuracy. Since the use of actual radarscope photography is not allowed, Capt Barringer studied Defense Mapping Agency Aeronautical Center (DMAAC) descriptions and aerial photographs of bridges, dams, and other exact radar returns. As he put it, "It was like preparing for dozens of bomb runs on a single mission."

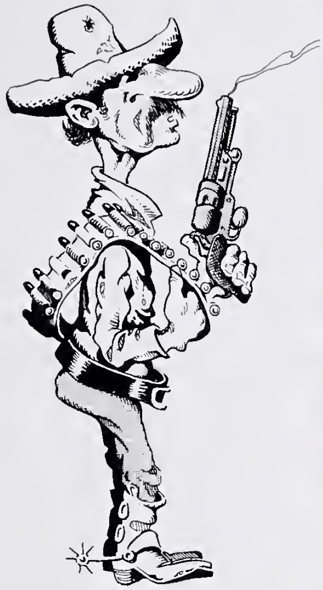
A great deal of the pilot's time was devoted to coordinating every aspect of the mission with the bomb wing, 8th Air Force, and the 4201st Test Squadron, Barksdale AFB, the SAC field agency responsible for the SRAM evaluation program. In addition to the normal Federal Aviation Agency clearance requirements, the remarks section of the Military Flight Plan was to include the statement: "BULLET BLITZ VI launch mission; route and altitudes critical to mission success." Capt Larkin went one step further. He personally called the area supervisor in every Air Route Traffic Control Center along the route and explained the mission and its requirements. That bit of extra effort prevented an Air Traffic Control conflict at the start descent point which could have caused a mission abort.

The week before the launch, the crew received a final briefing on range procedures from Maj Charles B. Johnson, test director representative from the 4201st. His unit would be manning Mission Control to monitor telemetry, exercise control over the range and the launch, and then evaluate the results. Using the FB-111 Weapons System Trainer, Capts Larkin and Barringer rehearsed every phase of the mission. Maj Johnson drilled them in the radio calls and countdown sequence while Capt Winkler reviewed normal procedures and missile malfunction analysis. Finally, two local training missions were flown to practice simulated launches. The crew was ready. The mission support time line was initiated.

Take Off (T) — 3 Days: The Non-Tactical Instrumentation (NTI) Team from the 2nd Munitions Maintenance Squadron, Barksdale, arrives to install the special test equipment in the aircraft and supervise the preparation of the missile. The FB-111 and SRAM are isolated. The payload section is removed from the missile booster, leaving the electronics and guidance section, rocket motor, and flight control section intact.

T — 2 Days: The Joint Test Unit (JTU) payload is mated to the booster. The JTU is a stockpile warhead configured to the inert state by Sandia Laboratories and instrumented with telemetry and a radar beacon. The 380th Munitions Maintenance Squadron personnel upload the assembled missile and

Captain Paul Winkler, 380th Bombardment Wing SRAM project officer, gives last minute instructions to Captain Richard Barringer.



Captains Thomas Larkin (left) and Richard Barringer attend maintenance debriefing after their successful SRAM launch mission.

instrumentation checks are accomplished by the NTI Team.

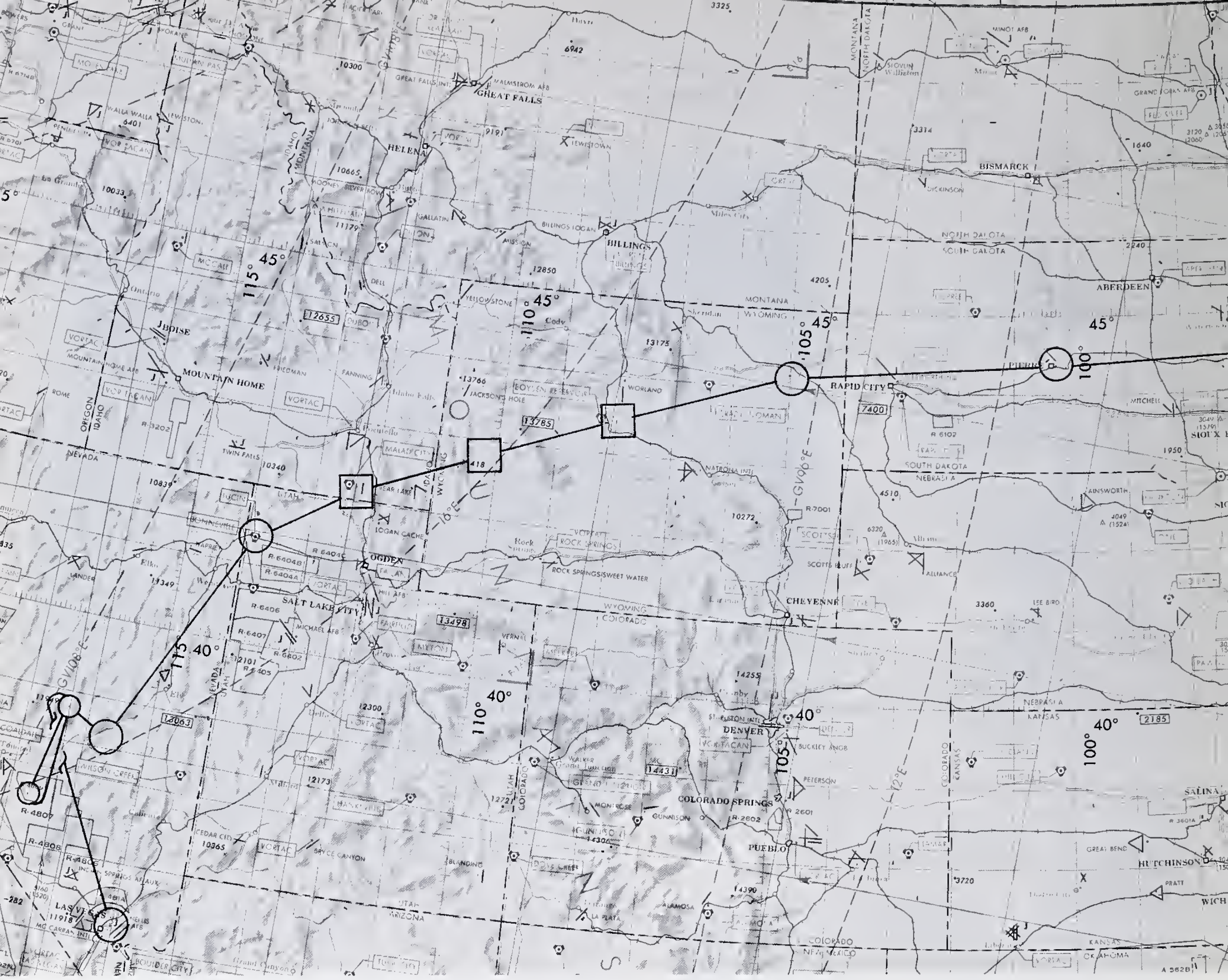
T — 1 Day: After loading the Mission Data Tape into the aircraft computers, the aircrew verifies the information during the alert acceptance preflight. The Inertial Navigation System (INS) is fully aligned and the switches left in position for the fast-reaction stored heading alignment. After pulling the SRAM safety pins, the weapon bay doors are closed and the plane is cocked for an alert scramble take-off. The weapons system is ready.

T — 0, March 30: After a cold, wet preflight, lots of last-minute advice, and handshakes all around, Spout-43 lifts off from Plattsburgh at 1410 EST. The overcast sky sets the tone for most of the mission. They will be flying IFC (in the clouds) from the first air refueling until entering the range. Although the FB-111 is a great all-weather airplane, water in the air reduces the effective range of the attack radar to 40-50 miles. Later, Capt Barringer recalled he was "sweating bullets" most of the time trying to identify his update points. The combination of 450 knots groundspeed and a 90-degree line-of-sight radar sector does not allow much time to confirm cross-hair placement.

Twenty minutes after takeoff, Spout-43 levels off at 24,000 feet heading southwest over Lake Erie. With the pilot backing him up, the navigator runs the checklists for applying power to the SRAM Carrier Aircraft Equipment (CAE) and checking out the numerous FB-111 systems. From preflight until engine shutdown, the crew will complete 41 separate checklists with a total of over 500 steps. In a weapons system where a single mispositioned switch can cause the failure of a mission, checklist discipline — following "The Book" step by step — is critical.

The reduced visibility, coupled with moderate turbulence in the air refueling (AR) tracks, also made the two inflight refuelings more challenging. KC-135 Stratotankers from Air National Guard units at General Billy Mitchell Field, Wisconsin, and the Air Force Reserve unit at March AFB, rendezvoused with Spout-43 over Lake Michigan and near Salt Lake City. Capts Larkin and Barringer both agreed the KC-135 crews were absolutely professional, "We were not equipped to paint their transponder beacons with our radar, and they never picked up our beacon due to the weather. The tankers ran the join-ups using alternate procedures, and they did a super job."

Five-and-a-half hours after takeoff, the crew makes contact with Tonopah Mission Control on High Frequency (HF) radio and the launch countdown begins. According to Capt Barringer, "The HF radio saved us as far as communications went. A combination of distance from the site, low altitude, and mountainous terrain prevented us from



getting good UHF contact until we were far along in the countdown."

Launch — 30 Min: Initial contact with the site. The crew passes aircraft and missile status and ETA to the release point, "Spout-43 confirms all systems in the green, no malfunctions. Estimating launch point on time." Tonopah relays that the range status and weather are both good.

L — 20 Min: "Spout-43, begin your prelaunch checklist and apply power to missile payload." While the navigator runs the checks, the pilot requests center clearance for the descent into the low level route. The center controller answers with a surprised, "Standby," The crew has just enough time to exchange worried looks before another voice comes over with "cleared as requested." Capt Larkin's prior coordination had paid off.

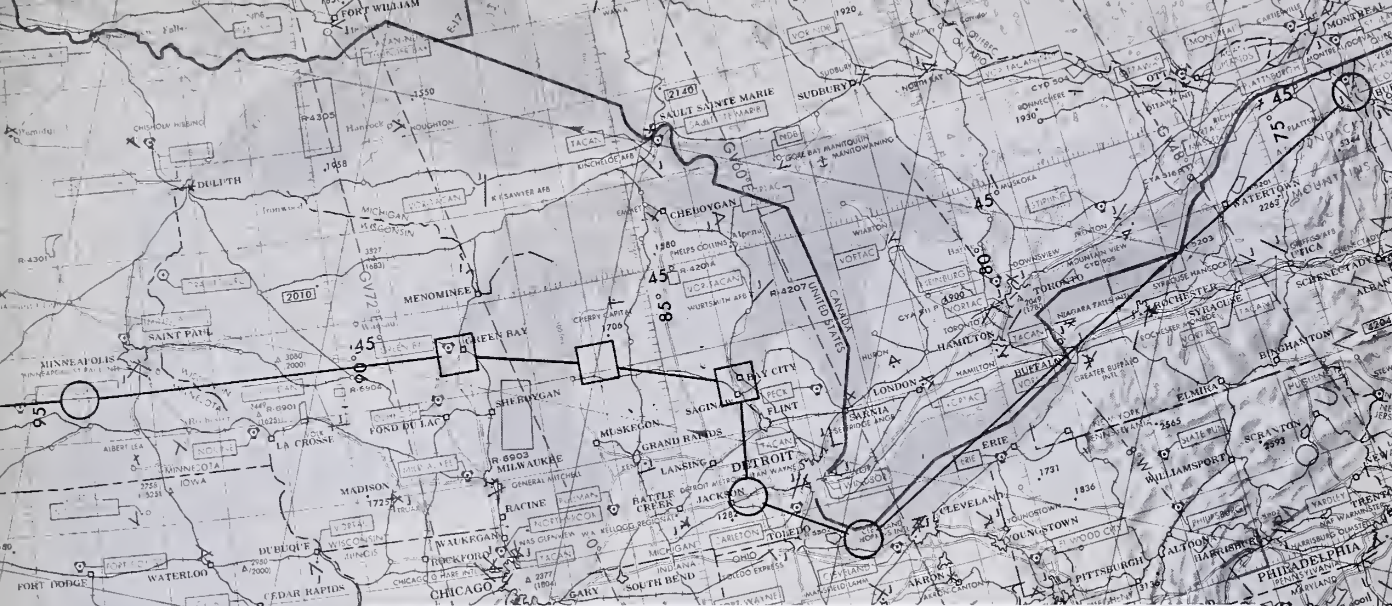
Conditions are still IFR, but the Terrain Following Radar (TFR) is tied into the autopilot and dives the plane down to the selected clearance plane setting — 1,000 feet above the ground. After the initial level off, 400 feet is selected, and as they cross the range boundary the weather clears.

L — 15 Min: Tonopah confirms they are tracking the aircraft and receiving clear telemetry signals. Capt Barringer is double and triple-checking his switch positions. Capt Larkin monitors the TFR and holds a steady 420 knot groundspeed.

L — 10 Min: Mission Control begins to countdown in one-minute intervals. Suddenly, the site reports they have lost the telemetry. Then UHF contact becomes unreadable. After a tense two minutes, they climb up over a high ridge and contact is reestablished.

L — 4 Min: Mission Control announces, "Standing by for final position update." The navigator is already tracking the final offset — the northeast corner of a building near the site. Failure to get the update requires a dry pass and then a racetrack to try again.

L — 2 Min: Crew confirms, "Entering final update now." Forty seconds later, Mission Control



"MISSILE AWAY!" With the first pulse glowing, the SRAM accelerates up and left toward the target. (Photo by Capt. Thomas M. Larkin)

orders, "Record present position and range on target number 301." "Roger, Control, ranging on 301."

L — 60 Sec: "Spout-43, the range is Green, you are cleared to launch." Either the crew or the site can abort the launch at any time, but only Mission Control can give clearance to launch.

L — 10 Sec: "10 . . . 9 . . . 8 . . . 7 . . . 6 . . . AUTO Capt Barringer initiated the automatic launch sequence — "4 . . . 3 . . . 2 . . . 1 . . . MISSILE AWAY!"

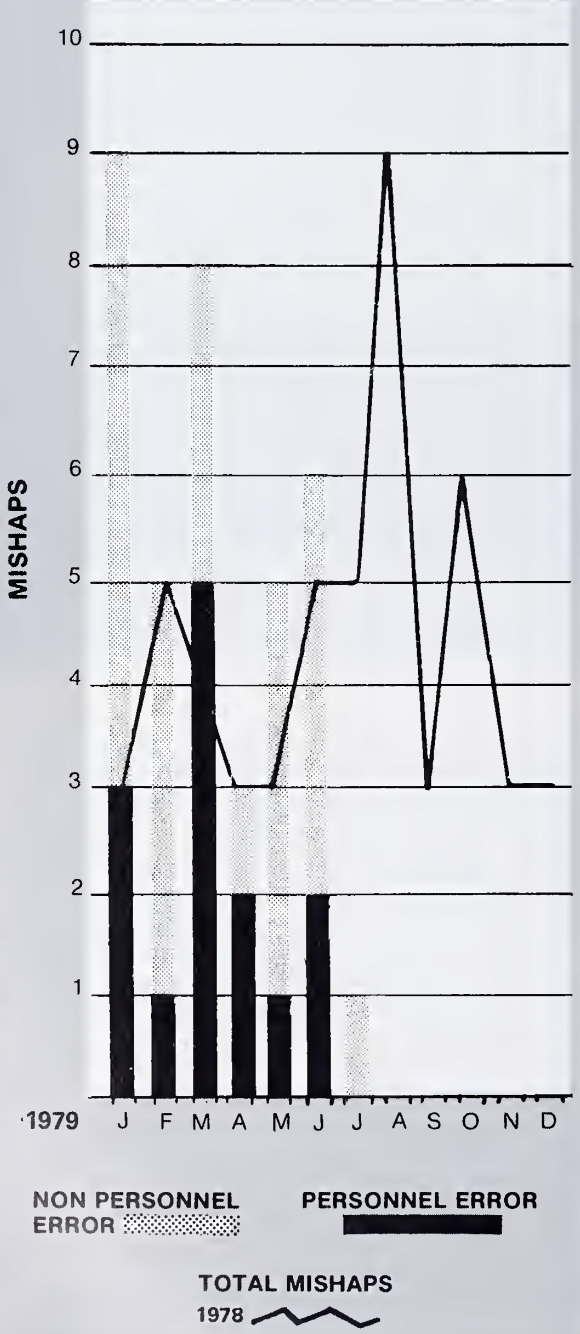
Capt Larkin remembers the rumble of the weapon bay doors opening and the distinct "thump" as the missile was ejected. "We could actually hear the rocket motor ignite, then . . . nothing. Maj Johnson had briefed us we would not see anything for about five seconds after release, but it seemed like a long, long time." Capt Barringer recalls worrying about the missile hitting the ground before they finally spotted it. "We could see the rocket's flame clearly as it pulled ahead of the plane, climbing and turning left toward the target. Then the second pulse cut in and it took off accelerating right out of sight."

As they climbed out of the range for the recovery into Nellis AFB, Tonopah contacted them once more to relay a message from Plattsburgh: "Congratulations from all the men and women of the 380th Bomb Wing for a superior performance. The wing is proud of your accomplishment of a very long and difficult mission in a manner which reflects credit on the wing and our finest aircrews."

Lieutenant General Edgar S. Harris, Jr, commander of 8th Air Force, recognized the outstanding team effort involved in these words: *"Congratulations on your superb BULLET BLITZ live launch. The circular error is indicative of thorough staff, aircrew, and maintenance preparation. The Tonopah Test Range Mission Controller stated the crew's performance was flawless. Congratulations to the men and women of the 380th Bomb Wing for a job well done."*

Missile Mishap Report

DOD CLASS A, B and C



Corrosion and System Degradation

TSGT David J. Tindol
Safety Technician
91SMW, Minot AFB

Last year, and during the first six months of 1979, several mishaps occurred that were caused by excessive water accumulation in the Minuteman Launch Facilities. In one instance, an inoperative sump pump and environmental control system combined to cause a high humidity condition. Over a period of time, condensation accumulated in the missile guidance set resulting in burned pins in the upper umbilical when power was applied. In two other specific reported mishaps, clogged AC5-H air conditioner drain lines allowed seeping subterranean water and condensation to overflow the suspension system jack plate access ports. In each of these cases the corrosion damage was severe enough to be reportable under AFR127-4 and caused extensive repairs to portions of the missile suspension system. Untreated corrosion and leaking water on and into the ESA filters resulted in complete LF power outage, then a B-plug failure and finally a forced entry. Unfortunately, the forced entry was met with problems and the end result was the launcher closure cables falling, striking and damaging the re-entry system. Also, water leaked into a lighting panel causing a fire.

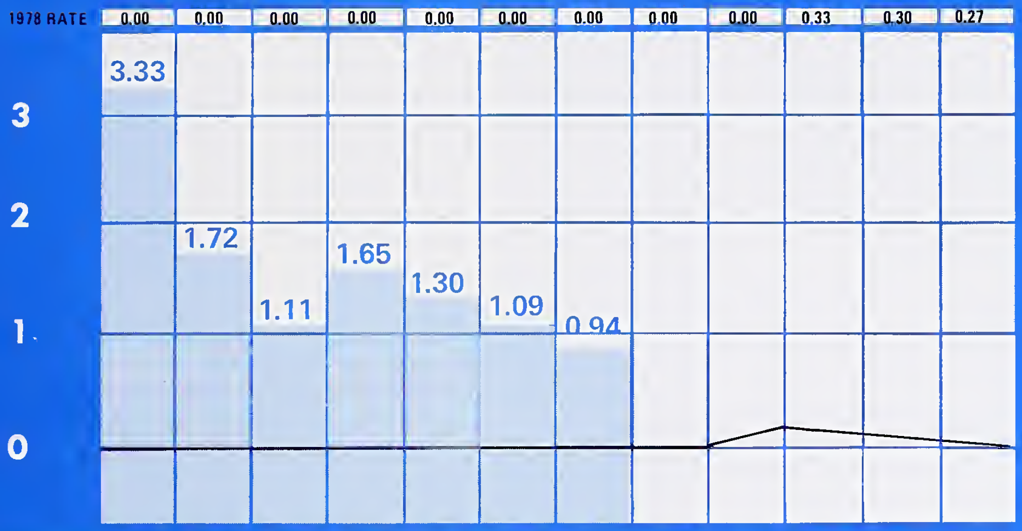
Remember that our facilities are getting older. They are being exposed to corrosive minerals and salts and many have been termed as "Leakers". Due to the age of our facilities we must be even more vigilant than in the past. You cannot afford to dismiss corrosion simply because you deem it "minor" or "not your job".

The key in preventing corrosive mishaps or system degradation is timely identification and correction of corrosive conditions. You, as technicians and supervisors, need to ensure that everyone is knowledgeable of the many clues or situations that could lead to high humidity in the launch facilities and that they are alert for and able to recognize these conditions during the conduct of their daily business.

The next time you are on site check, treat and properly document corrosive problems. Remember you could prevent a $20,000 + mishap. The problem will not go away by itself and as time goes on it will only get worse.

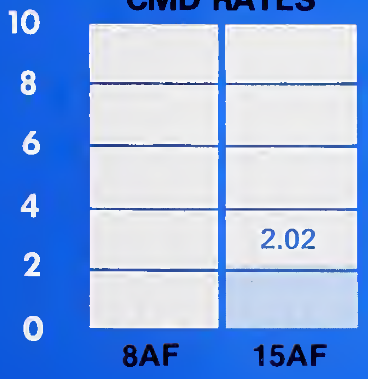
1979 Flying Safety Rate

SAC CLASS A MISHAP RATE (PER 100,000 FLYING HRS)



MISHAPS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1978	0	0	0	0	0	0	0	0	0	1	0	0
1979	1	0	0	1	0	0	0	1				

1979 SUBORDINATE CMD RATES



MISHAP STATUS

B-52H	JAN 79
KC - 135Q	APR 79
RC - 135	AUG 79

LEGEND ⌒ =1978 RATE

SOLAR ACTIVITY . . .

Continued from Page 13

VLF/LF navigation systems are also influenced by energetic proton fluxes into the polar caps, and often become degraded during the more active phases of geomagnetic storms. The OMEGA VLF navigation system is a system which is becoming predominate on overseas flights as a navigation backup. The lower regions of the ionosphere which are affected by solar X-rays greatly alter VLF wave propagation rendering these navigation systems temporarily useless. The sudden ionospheric disturbance, may hinder the reliability of these systems, and make it difficult to warn aircraft that the VLF system is not working properly.

During the very largest solar events, energetic proton fluxes are observed which are of sufficient intensity to present a radiation health hazard to the passengers and crews of high-flying SST aircraft in polar regions. Several significant proton events may be expected during each solar cycle and communication with such aircraft may be impossible.

The health hazard posed by proton flares on the sun is also of direct concern to humans in space. Astronauts on the way to the moon experience significantly higher exposure to fluxes or energetic particles than do astronauts orbiting within the earth's magnetosphere. Sometime during this oncoming solar maximum, a space shuttle mission may be delayed or terminated to avoid exposing the astronauts to dangerous radiation levels.

During the series of major flares in August 1972, it was found that there were abrupt degradations to solar power cells on some satellites, thus decreasing their useful lifetime. Efforts have been made to harden subsequent generations of spacecraft against these harmful effects. Proton fluxes are only one aspect of the hostile environment that satellites operate in. Another effect which has recently been discovered, is the so-called spacecraft-charging phenomenon. It seems that satellites at geostationary altitudes (approximately 20,000 nm) experience the buildup of extraordinary static electric potentials during large magnetic substorms. These static potentials have destroyed circuitry in some spacecraft and caused erratic operation in others.

The irregularities in the earth's ionosphere, which form during an ionospheric storm, can cause amplitude fluctuations, or scintillations, on VHF radio signals travelling through the ionosphere between ground stations and satellites, thus affecting command and control as well as data gathering. In addition, the solar radio noise storms mentioned previously also interfere with satellite communications (for 5-20 minute periods). These effects can degrade satellite circuitry and take them out of service.

Another problem that high solar activity presents to satellite systems is that the general level of solar activity (i.e., the level of extreme ultra-violet radiation from the sun), as well as the overall strength of magnetic activity, cause significant increases in the density of the neutral atmosphere at low orbitting satellite altitudes (below 500nm). This effect shortens the operating lifetime of all earth satellites due to increased atmospheric drag, but is more pronounced for low orbit satellites. Since it is expensive to launch spacecraft into orbit, this effect is not welcomed.

There are other more down-to-earth effects of major solar activity, or rather the magnetic storms which are produced by such activity. Depending on the magnitude of the magnetic storms and the ground conductivity in particular regions, transient currents can be induced in electric power distribution systems and in telephone long-line equipment which can activate protection equipment and knock the systems out of commission; and, in some cases destroy portions of the systems. The power blackout of New York in July 1977 was attributed to thunderstorms. The sun is capable (at times of high solar activity) of creating similar overloads on power distribution systems; and such overloads coming without warning could cause a major blackout somewhere in the United States during the upcoming high period of solar activity.

Telephone long-line systems are also subject to such disruptions. While disruptions of this nature might not have serious consequences; they would most likely occur at the time other modes of communication fail. Moreover, telephone long-lines are commonly used to interface computer systems. Increased solar activity could lead to computer "scrambling" or the transfer of erroneous data.

In the nuisance category, magnetometer survey work in search of natural resources (petroleum or minerals) cannot continue during a disturbed magnetic period. Furthermore, measurements vital to corrosion control on long pipelines cannot be made when the geomagnetic field is disturbed.

Does solar activity directly affect the weather? Over the short-term, it has been suggested that the onset of a magnetic storm tends to intensify local weather systems. If this is true, real-time space environmental data may become an important ingredient for short-term forecasting. Longer-term effects of solar activity on the climate, though not well understood, are gaining acceptance. Clearly solar activity has some influence on the earth's atmosphere — whether this is a governing influence remains to be seen.

As we create newer and more sophisticated technology, the list of solar activity effects on human activity will grow; often new vulnerabilities will not be suspected until they occur. We must seek to understand the effects of solar activity on our environment and learn to live with a sun we cannot control.

CFIC CORNER

Continued from Page 19

possibly can to insure that the yaw is stopped and to allow aircraft to gain additional airspeed. You only need 1000 feet of runway to get airborne, so don't rush your rotation to the point of taking off when the yaw is not completely stopped.

Recovery from an Engine Loss at or After Rotation

An engine failure at or just after rotation is, without a doubt, the most hazardous situation you can be faced with. Once the aircraft is rotated, your only reliable aids to help you control the airplane are your flight instruments, specifically the ball. You'll need to center the ball as soon as you possibly can. If you fail to react or apply rudder incorrectly, yaw will dramatically increase. As little as three seconds delay can result in yaw angles of over 8 degrees and bank angles over 12 degrees.

You will also need to concentrate on pitch. While yaw and roll are being combatted with rudder (and some aileron/spoilers) you may become distracted and fail to notice a small change in pitch. Remember, at take-off speeds, a pitch attitude 2 to 3 degrees in excess of the recommended takeoff attitude may place the airplane is a position from which it can neither climb nor accelerate. A decrease in pitch attitude of as little as 1 to 1½ degrees can cause the aircraft to descend. Either way you're in trouble, so don't forget to maintain 8° to 9° of pitch as you correct yaw.

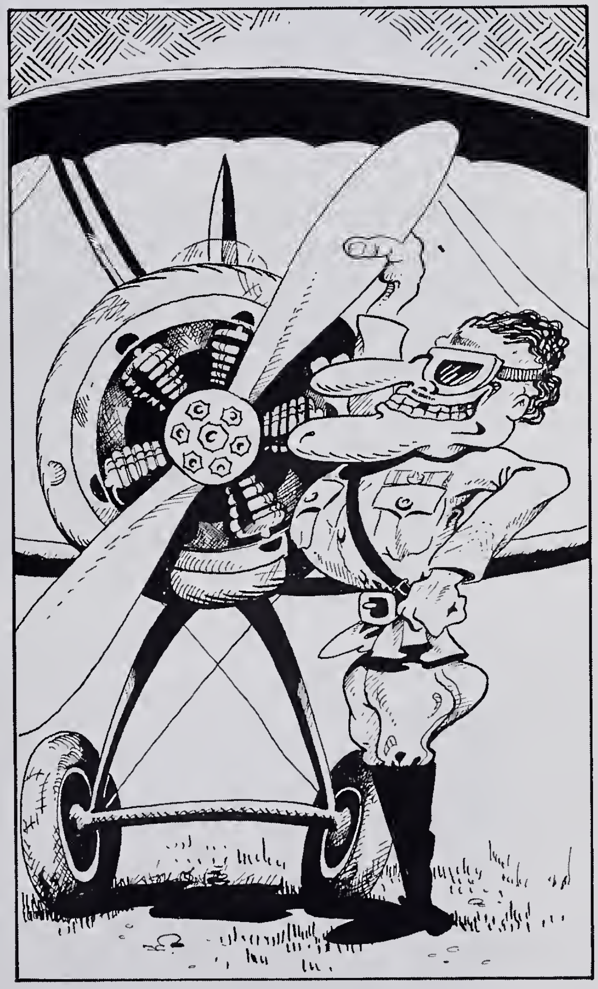
One final thing about control. Anytime you experience an engine failure you will discover that an increase in airspeed is in your favor. Airspeed is the breath of life. The more airspeed you gain, the more directional control authority you will have. The rudder is obviously more effective as you gain speed, so consider reducing your climb rate slightly (obstacles permitting) to allow airspeed to increase. Remember not to descend as sink rates/descents are difficult to arrest at best.

Next time you look at the weekly 60-9, and are scheduled for a heavy weight takeoff, you should feel a lot better about it. Secure in the knowledge that with proper mental and physical preparation and the proper flight techniques and procedures you can handle any engine failure with ease. If you always attempt to maintain that centerline up to rotation and then concentrate on the ball and pitch attitude during the remainder of the takeoff, you will definitely stack the deck in your favor. Then, if you have an engine failure simply apply the "Fly the Airplane" principle. Doing this will insure that all your takeoffs will lead to happy landings.

DEBRIEF

Mirror, mirror on the wall, who was the fairest of them all?

As you probably noted, the Giant Sword article in this issue has an incomplete list of past winners. *Combat Crew* would like to get this list up to date and would appreciate hearing from anyone who knows who the winning units were during the 1958 October competition at March AFB, and the 1959 competition at Bergstrom. We have checked our records and the SAC Historian to no avail; so now, we turn to our readers.



PROFESSIONAL PERFORMERS

Individuals selected for these pages as SAC's top professional performers of the month are chosen from nominations made by all SAC units. Selection is made only after all nominations have been carefully screened and those chosen meet the highest standards of excellence outlined in SACR 127-2.

SAFETY MAN

Mr. Lawrence ten Bensel has directed a vigorous program of safety awareness and compliance at F. E. Warren AFB. Mr. ten Bensel has brought a high level of experience and expertise to his safety duty. His management of the safety program centers around a monthly inspection. The squadron commander, safety officer, and branch chief perform an indepth inspection of a selected branch. Mr. ten Bensel also maintains a good management book, provides good safety publicity and keeps safety training backlogs at a minimum.

TITAN CREW

While on alert, crew R-083, Davis-Monthan AFB, repeatedly displayed superb skill and competence in handling two major problems that threatened the safety of all personnel on complex and required emergency evacuation of an injured maintenance team member. After completion of a missile propellant recycle operation at a complex a leak developed in the oxidizer pump room during repressurization. Immediately upon discovery of the leak, Lt Gaglio ordered the silo equipment area evacuated. In conjunction with the propellant transfer system (PTS) team chief, the crew implemented hazard procedures to safe the system and to minimize damage. With the leak isolated, Lt Gaglio directed the PTS team to re-enter the silo, confirm the cause of the problem, and begin cleanup operations. During cleanup procedures, a small amount of the highly toxic oxidizer liquid spilled on one PTS team member's leg. Lt Gaglio immediately insured the injured individual was thoroughly washed in accordance with safety procedures. Meanwhile Lt Baker advised the unit command post and coordinated helicopter evacuation. Within minutes, the helicopter was at the complex and the injured person was airlifted to the support base hospital. As a result of the timely actions on the part of crew R-083, the injury was minimized and the PTS team member was released from the hospital within 12 hours, Lt Gaglio and his crew performed all actions in strict compliance with safety directives and technical orders. Sound, sensible judgment on the part of all crewmembers was displayed throughout the incident.

TITAN Crew R-083, 390th SMW, Davis-Monthan AFB: MCCC 1Lt Joseph P. Gaglio, DMCCC 1Lt Davis W. Baker, MSAT A1C Charles Stelley, and BMFT SrA Jerry E. Smith.

MINUTEMAN Crew E-144, 351st SMW, Whiteman AFB: MCCC 1Lt Robert C. Holley, and DMCCC 2Lt Mark J. Coyne.

MINUTEMAN CREW

1Lt Robert C. Holley and 2 Lt Mark J. Coyne Crew E-144, 351st Strategic Missile Wing, are named Minuteman Crew of the Month.

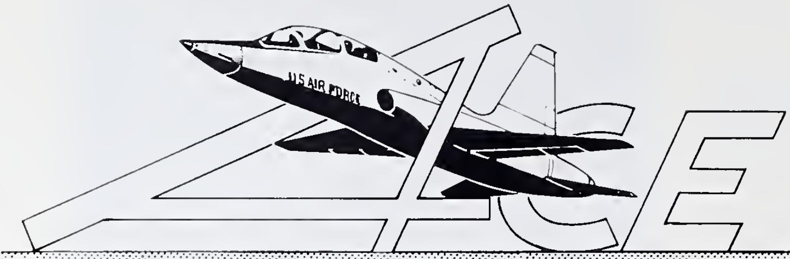
Lt Holley's expertise was demonstrated when unexpected erratic status was experienced at all operational launch control centers in the 510 SMS. In order to circumvent the problem, Lt Holley, who was on duty at the Primary Squadron Command Post, initiated emergency procedures and coordinated squadron entry into the anti-jam mode of operation. For 16 hours, repeated attempts to resume normal operations resulted in a recurrence of the problem and required the squadron to revert back to anti-jam operation. Lt Holley eventually coordinated squadron anti-jam mode entry and exit approximately 50 times before the cause of the problem was identified and corrected by wing job control.

Lt Coyne was instrumental in resolving a very dangerous situation involving a massive diesel fuel leak at one of the launch control facilities. Due to a blockage in the exhaust air duct and a subsequent back pressure, diesel fuel backed up through a venting valve into the launch control equipment building (LCEB). By the time Lt Coyne had arrived at the site to assume alert, a mixture of water and diesel fuel was covering the LCEB floor to a depth of two to three inches. The resulting fumes were so dense that they produced a haze in the tunnel junction area. Upon assuming alert, Lt Coyne immediately began notifying responsible base agencies of the urgency of the situation.

In addition to canceling scheduled visitor tours to the site, he isolated the LCC air supply from the contaminated atmosphere in the LCEB. He also received permission from wing job control to shut off electrical equipment in the LCEB and to leave the tunnel junction blast door and top side freight doors open to relieve the back pressure and to exhaust the fumes thus mitigating the danger of a serious explosion. As a result of Lt Coyne's sound judgment and decisiveness, a potentially catastrophic situation was averted without any personal injury or damage to equipment.

MAINTENANCE MAN

TSgt Joseph E. Carter, Jr., 416 Bomb Wing, Griffiss AFB is SAC Maintenance Airman of the Month, for outstanding initiative, technical competence and leadership abilities. Sgt Carter is adept at planning and organizing his workload efficiently. Through expert managerial abilities, he is able to provide resources from his area to assist other functions within the unit. He is constantly searching for improved work methods and refined procedures. To provide greater protection for high value test equipment in his area, he designed and supervised the manufacture of rollaround test equipment cabinets. By rearranging his work area, he also provided the space required to relocate the T.O. library making it more convenient to all. Sgt Carter is a dedicated noncommissioned officer and an asset to SAC and the United States Air Force.



ACE TOPICS

HOT DOG ALUMINUM

How much "margin for error" do you want? Answer by asking some questions. Where am I? What am I doing? What's my malfunction? You're on takeoff leg close to the runway, you suck the gear early and you can pick the malfunction. The problem is that just about any malfunction or misjudgment close to the runway is critical. Early gear retractions just complicate the situation. Now don't get me wrong. I'm not saying leave the gear down till passing 100 feet. It's the gear up (and flaps shortly thereafter) when only 10 feet off the deck that I'm talking about. What about a bird strike, compressor stall, stuck nozzle, flap/slab interconnect failure, jet wash or windshear? Everything becomes important and guess when these problems are most likely to occur? That's right. I can't think of any worthwhile advantages to sucking the gear up early. Just look at some of the sheet metal shop overtime hours and you'll see some disadvantages. — Capt Seeley

AN OUTSTANDING JOB — ALMOST

Stop me if you've heard this one. "If all gears are fully down but one or more are indicating unsafe, stop straight ahead on the runway and have the gear safety pins installed." A couple of our aviators read it too, and they almost understood what it meant. It seems that after a gear lowering exercise in formation, they experienced a problem. They heard a bang and with both gear handles up, their wingman confirmed that all three gear doors were open and the right gear was down and locked, so they slowed down and put the gear handle down. Both cockpits indicated green lights in the nose and left main gear. The right main still indicated unsafe. The wingmen reported that the gear appeared to be down and locked so the decision was made to land. So far so good. Touchdown was smooth and the crew stopped straight ahead to have the pins installed.

It was at this point when things went awry. Something was definitely wrong with the right main gear — so wrong in fact that the safety pins **could not be inserted.** Guess what happened. The crew taxied clear and shut it down. I always thought the reason why we stopped straight ahead was to keep sideloads off of the gear. The correct solution would have been to shut down on the active and let maintenance tow the bird away after ensuring that the danger of a gear collapsing had been rectified. Deduct one "atta boy" each from the crew **and** maintenance troops!! — Lt Col Hodgson

A DOUBLE WHAMMY!

Not long ago a T-38 FCF pilot was the recipient of a double whammy from the maintenance side of the house. It seems the pilot was dutifully accomplishing the inverted portion of the FCF profile when after about 15 seconds both hydraulic caution lights illuminated. The pilot quickly returned to level flight and noted zero hydraulic pressure on both systems. Since this would make both flight control systems inoperative, it can be assumed the pilot's pulse rate increased dramatically. Fortunately, 10 seconds later the utility hydraulic pressure recovered and after a minute the flight control hydraulic system pressure returned to normal. During recovery the hydraulic systems were slow to react to demands on the system, but a successful landing was accomplished. Postflight investigation revealed that both hydraulic filler caps were not properly seated and locked. This is somewhat alarming since the hydraulic filler caps provide an easy indication of whether they are locked or not. I'll quote from TO 1T-38A-2-2, "When green dot shows on cap, indicator cap is locked; when red dot shows, cap is unlocked." It is obvious the individual who serviced the airplane didn't check for the green dot. Failure to complete a simple task came close to destroying an airplane. It should be stressed that even minor or routine items such as hydraulic servicing have the potential for serious consequences if not properly accomplished in accordance with tech data. — Maj Myer

SAC SAFETY SCREEN

384 AREFW, McConnell Crew E-163: P Capt Don R. Darnell, CP 2Lt John A. Herchak, N Capt William M. Finney, BO SSgt John B. Stanford

384 AREFW, McConnell Crew R-111: P Capt William J. Pantesco, CP 1Lt Gary L. Scoggins, N Capt Mark A. Lancaster, BO SSgt Jacob R. Benscoter, Jr

305 AREFW, Grissom Crew R-133: P Capt Maurice F. Sonner, CP Capt David W. Floyd, N 1Lt Michael R. Filler, BO SrA Paul A Coverstone

305 AREFW, Grissom Crew S-144P: P Capt Charles J. Buebendorf, CP 1Lt James D. Rorabaugh, N Capt Francis J. Crespo, BO SSgt Jack M. Patton

380 BMW, Plattsburgh Crew R-25: P Capt Franklin Baehre, RN Lt Larry McCann

380 BMW, Plattsburgh Crew E-65: P Capt Larry Fernald, RN Capt Mike Prusak

380 BMW, Plattsburgh Crew S-157: P Capt Ralph Hensel, CP Capt David Duncan, N Lt Stew Pugh, BO SrA Julio Calero

380 BMW, Plattsburgh Crew E-120: P Capt Mike Sherman, CP Capt Thomas Davis, N Lt Dennis Muhn, BO SrA Grayam Scheel

157 AREFG (NHANG), Pease AFB: P Lt Col John P. Slauson, CP 1Lt Gabriel V. Tremblay, N Capt Murray L. Little, BO SSgt Stephen S. Morgan, P Capt Thomas J. Bunting, CP Capt Eldon M. Bender, N Capt Gregory J. Bapp, BO MSgt Raymond C. Richardson

931 AREFG, Grissom AFB (AFRES): P Capt Anthony P. Capoccia, CP Capt Vik C. Malling, N Capt David A. Ziegler, BO TSgt Steven E. Fromm

44 SMW, Ellsworth Crew R-020: MCCC Capt Edward G. Doolittle, DMCCC 2Lt David W. Ruffin

90 SMW, F E Warren Crew R-053: MCCC Capt Richard L. Layman, DMCCC 2Lt Mark H. Berner

308 SMW, Little Rock Crew E-034: MCCC Michael J. Mazzaro, DMCCC 2Lt Gerrit J. Allen, MSAT A1C Earl D. Hotchkiss, MFT A1C Peter J. Kalata

321 SMW, Grand Forks Crew E-133: MCCC 1Lt William E. Best, DMCCC 1Lt Mark D. Schubert

381 SMW, McConnell Crew R-032: MCCC 1Lt Thomas E. Ittig, DMCCC 2Lt Richard A. Moss, MSAT A1C Shawn F. Fair, MFT A1C Charles J. Bibeau

100 AREFW, Beale Crew E-118: IP Maj Charles E. Hogan, CP Capt Daniel P. Ballard, IN Capt David E. Brown, IBO Sgt Bobby Lynah

319 BMW, Grand Forks Crew R-18: P Capt Thomas A. O'Riordan, CP Capt David A. Ochsner, NB Capt Michael P. Kramer, NN 2Lt Jeffrey A. Perkins, NE 1Lt Nolan F. Mackness, AG A1C Lance B. Sigmon

93 BMW, Castle Instructor Team 20: IP Capt William K. Ohlmeyer, IN Capt Joseph C. Stein, IEW Capt Gary A. Horne, IG SSgt Charles W. Swanberg

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW SACR 127-2.*

★ U.S. Government Printing Office
1979-665-046/7

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HALL OF FAME

TACTICAL FLYING

OVER TWENTY-THREE YEARS

170 AREFG. McGuire (NJANG)	None

OVER TWENTY-ONE YEARS

171 AREFW. Greater Pittsburgh (PAANG)	Mar '58
157 AREFG. Pease (NHANG)	Jun '58
97 BMW. Blytheville	Aug '58

OVER TWENTY YEARS

940 AREFG, Mather (USAFR)	May '59

OVER NINETEEN YEARS

307 AREFG, Travis	Sep '59

OVER EIGHTEEN YEARS

151 AREFG, Salt Lake City (UTANG)	Feb '61
161 AREFG, Sky Harbor (AZANG)	Apr '61
126 AREFW. Chicago O'Hare (ILANG)	Apr '61
134 AREFG. McGhee Tyson (TNANG)	Aug '61

OVER SEVENTEEN YEARS

340 AREFG, Altus	Feb '62
96 BMW, Dyess	Aug '62

OVER SIXTEEN YEARS

19 BMW, Robins	Aug '63

OVER FOURTEEN YEARS

160 AREFG, Rickenbacker (OHANG)	Dec '64
320 BMW. Mather	Jul '65

OVER TWELVE YEARS

452 AREFW, March (USAFR)	Sep '66
92 BMW, Fairchild	Feb '67
55 SRW, Offutt	Jul '67
2 BMW. Barksdale	Aug '67

OVER TEN YEARS

5 BMW, Minot	Feb '69

OVER NINE YEARS

42 BMW, Loring	Sep '69
141 AREFW, Fairchild (WAANG)	Oct '69
28 BMW, Ellsworth	May '70

OVER SEVEN YEARS

7 BMW, Carswell	Mar '72
101 AREFW, Bangor (MEANG)	Mar '72
416 BMW, Griffiss	May '72
305 AREFW, Grissom	Aug '72

OVER SIX YEARS

376 SW, Kadena	Nov. '72
379 BMW. Wurtsmith	Apr '73

OVER FIVE YEARS

931 AREFG, Grissom	Feb '74
384 AREFW, McConnell	Mar '74
189 AREFG. Little Rock (ARANG)	May '74

OVER FOUR YEARS

43 SW. Andersen	Dec '74

ICBM

OVER FIFTEEN YEARS

90 SMW. F E Warren	Jul '64

OVER FOURTEEN YEARS

1 STRAD. Vandenberg	Sep '64
308 SMW. Little Rock	Aug '65

OVER NINE YEARS

341 SMW. Malmstrom	Apr 70

OVER SIX YEARS

390 SMW. Davis-Monthan	Jul '73

OVER FOUR YEARS

351 SMW. Whiteman	Oct 74
91 SMW. Minot	Nov 74

To gain listing in the Hall of Fame a SAC or ARF unit must be Class A mishap-free for 48 months